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AUTHOR Clagett, Craig A.
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ABSTRACT

The discipline cost analysis system for Maryland's community colleges yields information on costs per course, costs per student credit hour, and costs per full-time equivalent student for each intellectual discipline. Costs are assigned to individual course sections and then amalgamated at the discipline level. Total cost figures are the sum of faculty compensation, additional direct instructional costs, and indirect or overhead costs. Three factors account for much of the variation among disciplines: average class size, full-time/part-time faculty ratio, and faculty rank. In fiscal year (FY) 1988, the following figures were calculated for Prince George's Community College (PGCC): (1) the overall cost per full-time equivalent student was $3,096, down 0.7% from FY 1987; (2) for credit courses, the average cost was $3,302, while for noncredit courses the average was $2,603; (3) general education courses in the arts and sciences continued to be more expensive than occupational or continuing education instruction; (4) the disciplines with the highest per student costs were all in health technology; (5) PGCC's costs per student in credit classes were less than both the statewide average and averages for the six largest Maryland community colleges; and (6) adjusting for inflation, PGCC's cost per student in 1987 was less than that of 1980. (AJL)

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# DISCIPLINE COST ANALYSIS

# FOR FISCAL YEAR 1988

PRINCE GEORGE'S
COMMUNITY COLLEGE

**Office of Institutional Research and Analysis**
**Report to the Board of Trustees BT89-3**

**December 1988**

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PRINCE GEORGE'S COMMUNITY COLLEGE
Office of Institutional Research and Analysis

# DISCIPLINE COST ANALYSIS FOR FISCAL YEAR 1988
Report to the Board of Trustees BT89-3
December 1988

Overview: Discipline cost data as submitted to the State Board for Community Colleges are reported for fiscal year 1988, along with aggregate figures since 1980 for comparative purposes. The overall cost per full-time-equivalent student in FY88 was $3,096, down 0.7 percent from the year before.

## Introduction and Methodology

Community colleges in Maryland have been reporting discipline cost information to the State Board for Community Colleges for over a decade. The discipline cost analysis system as developed by SBCC yields cost per course, cost per student credit hour, and cost per full-time-equivalent student for each instructional discipline. The analysis uses actual expenditure data and is run at the end of each fiscal year. Costs are assigned to individual course sections and then amalgamated at the discipline level. The resulting unit cost figures are for disciplines or subject areas rather than curricula or programs.

Total cost figures are the sum of faculty compensation, additional direct instructional costs (including classroom or laboratory supplies and equipment) and indirect or overhead costs (allocated to each section based on credit hours generated). In fiscal year 1988, total costs were constituted as follows for credit (both general and occupational education) courses:

Components of Total Cost, Credit Courses, FY88

| | Total Expenditures | Cost per FTE | Percent of Total |
|---|---|---|---|
| Faculty compensation | $ 9,697,145 | $1,453 | 44% |
| Additional direct cost | 672,157 | 101 | 3 |
| Overhead | 11,668,689 | 1,748 | 53 |
| Total cost | $22,037,991 | $3,302 | 100% |

## Limitations

This report is limited to an analysis of unit cost data produced by the State Board for Community Colleges discipline cost analysis system. The state tends to focus on total cost per credit hour or FTE in its use of these data. It can be argued that analysis of the direct (faculty compensation and additional direct) costs exclusive of overhead would be more fruitful for discipline-level analysis. Instructional cost center managers cannot be held responsible for controlling indirect costs. Indirect costs should be analyzed separately, utilizing comparative staffing, physical plant, and other statistics for similar institutions for reference. Inclusion of overhead in discipline comparisons can dilute the differences in direct costs. For example:

(1) Using total cost per FTE:

| | |
|---|---|
| Nursing total cost/FTE | $5,669 |
| Collegewide total cost/FTE for credit coursework | 3,302 |

Nursing is 72 percent above average college cost

(2) Using direct cost per FTE:

| | |
|---|---|
| Nursing direct cost/FTE | $3,921 |
| Collegewide direct cost/FTE | 1,554 |

Nursing is 152 percent above average college cost

Because of the large impact of indirect costs, statewide and inter-institutional comparisons of total cost unit figures can be problematic. Apparent differences in discipline costs may reflect variations in overhead.

Users of the state's discipline cost data should also be aware of the determinants of direct costs. Factors other than inflation that influence discipline costs include average class size, full- and part-time faculty utilization, faculty rank, equipment and support costs, and instructional methodology. High contact/credit hour ratios, limited class capacities, and expensive equipment requirements often yield high costs for disciplines with extensive clinical or laboratory courses. Three factors accounting for much of the variation across disciplines are:

(1) **Average class size.** Large classes bring average costs down. Courses attracting fewer students or with enrollment capacity limitations due to equipment or clinical supervision constraints necessarily have higher average costs. With a direct impact on the denominator of the ratio calculations, class size

explains a large part of the variation in discipline unit costs. Large class sizes can mitigate the influence of disparate faculty compensation rates.

(2) **Full-time/part-time faculty ratio.** Departments with a high proportion of part-time faculty will have lower average costs than those where a higher percentage of courses are taught by full-time instructors. On average, full-time instructors receive compensation more than three times that of part-time faculty for a given teaching load. Younger disciplines, whose growth was made possible by employment of part-time instructors, usually have lower average costs than older, established disciplines with relatively stable enrollments and staffed primarily by full-time faculty.

(3) **Faculty rank.** Full professors at the top of the scale receive compensation two and a half times that of beginning assistant instructors. Disciplines taught primarily by full professors with many years of service to PGCC will, other things being equal, have higher unit costs than those staffed with more recent hires of lower rank.

Because of the major influence of faculty compensation on direct costs, apparent differences in per-student costs between disciplines may reflect institutional history more than any inherent productivity differences between disciplines. A discipline may be less expensive because it is relatively new, or because it grew during a period when the college was not adding full-time faculty, rather than due to the nature of its subject matter or instructional methodology. A different research design, using FTE faculty or similar measures rather than salaries, might be more appropriate if productivity comparisons untainted by length of service or other historical factors was the goal.

The balance of this report analyzes the total costs per FTE as generated by the state software. These are the figures used by the State Board for Community Colleges in its program data monitoring system and other reports.

## Trends in Overall Cost per Student, FY80-88

In fiscal year 1988, the college expended $29.3 million to deliver courses to the equivalent of 9,467 full-time students, in both credit and noncredit programs. The resulting cost per student was $3,096, down slightly from FY87's cost of $3,118. Total costs, FTE students, and costs per student for the past nine fiscal years are presented in the following table:

Total Cost per FTE Student, FY80-88

| Fiscal Year | Total Expenditures | Total FTEs | Cost per FTE |
|---|---|---|---|
| 1988 | $29,305,779 | 9,467 | $3,096 |
| 1987 | 28,598,742 | 9,172 | 3,118 |
| 1986 | 25,975,507 | 8,960 | 2,899 |
| 1985 | 25,143,727 | 9,252 | 2,718 |
| 1984 | 24,447,040 | 9,423 | 2,594 |
| 1983 | 23,276,218 | 9,630 | 2,417 |
| 1982 | 19,926,005 | 9,273 | 2,149 |
| 1981 | 18,348,552 | 8,792 | 2,087 |
| 1980 | 17,047,392 | 8,638 | 1,974 |

Per Student Cost Trends, by Discipline Type, FY80-88

General education courses in the arts and sciences continued to be more expensive than occupational or continuing education instruction. The average cost per student in general education courses in fiscal year 1988 was $3,364, a 1.5 percent decrease from FY87. Occupational credit courses cost an average of $3,171 per FTE, down 2.2 percent. Noncredit courses cost $2,603 per FTE in FY88, up 3.3 percent from the prior year. Costs per FTE student in each discipline type for the past nine fiscal years were as follows:

Total Cost per FTE Student, by Discipline Type, FY80-88

| Fiscal Year | General Education | Occupational Education | Continuing Education |
|---|---|---|---|
| 1988 | $3,364 | $3,171 | $2,603 |
| 1987 | 3,416 | 3,243 | 2,520 |
| 1986 | 3,159 | 2,976 | 2,307 |
| 1985 | 3,011 | 2,843 | 1,842 |
| 1984 | 2,708 | 2,553 | 2,267 |
| 1983 | 2,475 | 2,366 | 2,253 |
| 1982 | 2,190 | 2,189 | 2,008 |
| 1981 | 2,105 | 2,059 | 2,055 |
| 1980 | 2,193 | 1,965 | 1,870 |

Per-student Costs in Individual Disciplines in FY88

Per-student costs were identified for 57 disciplines in fiscal year 1988. Total cost (including overhead allocations),total FTEs, and cost per FTE for each general education and occupational discipline are presented in appended

tables. Average per-student costs for each major discipline cluster were as follows:

Total Cost per FTE Student, by Discipline Cluster, FY88

| | |
|---|---|
| Health Technology | $6,047 |
| Physical and Health Education | 5,239 |
| Engineering Technology | 4,607 |
| Natural Sciences | 3,659 |
| English Studies | 3,639 |
| Humanities | 3,387 |
| Social Sciences | 3,084 |
| Mathematics/Engineering | 3,029 |
| Computer Technology | 2,975 |
| Business and Management | 2,792 |
| Developmental Studies | 2,725 |

Cost per FTE in individual degree-credit disciplines ranged from a high of $9,190 in Medical Isotope Technology to a low of $2,443 in Real Estate courses. Inter-disciplinary honors symposia had the highest cost-per-student at $14,962, largely due to the costs associated with furnishing the new honors program office. (The state programs include in the additional direct costs assigned to each discipline all non-faculty costs in the associated department or cost center.) Disciplines with per-student costs at the extremes were as follows:

High and Low Cost Disciplines in Fiscal Year 1988

| Highest Cost per FTE | | Lowest Cost per FTE | |
|---|---|---|---|
| 1. Medical Isotope | $9,190 | 1. Real Estate | $2,443 |
| 2. Respiratory Care | 8,103 | 2. Horticulture | 2,505 |
| 3. Health Services | 6,851 | 3. Marketing | 2,541 |
| 4. Radiography | 5,715 | 4. Paralegal | 2,570 |
| 5. Nursing | 5,669 | 5. German | 2,599 |

As can be seen, the five disciplines with the highest per-student costs in fiscal year 1988 were all in health technology.

## Statewide Comparisons, FY82-87

To place PGCC's cost data in perspective, statewide information was obtained from the State Board for Community Colleges for fiscal years 1982 and 1987, so that five-year trends could be calculated. (Fiscal year 1988 data for the state were not yet available.) These figures document PGCC's relative cost

efficiency. During this period, Prince George's spent substantially less per student to deliver credit courses than both the average for the six largest community colleges in the state and the overall statewide community college average:

Total Cost per Student, by Discipline Type, FY82-87

| | FY82 | FY87 | Percent Change 82-87 |
|---|---|---|---|
| General Education | | | |
| Prince George's Comm. Coll. | $2,190 | $3,416 | +56 |
| Average 6 largest MD CC's | 2,724 | 3,683 | +35 |
| Statewide average | 2,694 | 3,766 | +40 |
| Occupational Education | | | |
| Prince George's Comm. Coll. | $2,189 | $3,243 | +48 |
| Average 6 largest MD CC's | 2,654 | 3,651 | +38 |
| Statewide average | 2,643 | 3,849 | +46 |
| Continuing Education | | | |
| Prince George's Comm. Coll. | $2,008 | $2,520 | +25 |
| Average 6 largest MD CC's | 1,958 | 1,823 | - 7 |
| Statewide average | 2,073 | 2,120 | + 2 |

PGCC's per-student costs for credit classes in general and occupational education, though they increased at a greater rate than state averages over the FY82-87 period, remained notably lower than state averages. Unit costs for continuing education increased less rapidly than (and remained below) credit costs at PGCC, but exceeded statewide averages in FY87. Overall, Prince George's can be proud that it delivers quality education relatively inexpensively, evidence of cost-effective management. But the comparatively low per-student expenditures in credit classes also mean that the college has had relatively fewer resources to expend. The colleges that have more to spend per student are probably not unhappy with their situation.

## Constant Dollar Cost per FTE Trends

While PGCC's unit costs have been comparatively low, they increased steadily in recent years. How much of the increasing per-student cost can be explained by inflation? One way to assess this is to convert expenditures to constant (uninflated) dollars by use of a price index. Changes in the price index

reflect changes in the dollars required to purchase the same kinds and amounts of goods and services previously purchased. (The price index measures price changes from a designated reference date, for example 1971, which is given the value 100.0. An index of 115 would represent a 15 percent increase over 1971 values; goods and services purchased for $100 in 1971 would cost $115.) A special index has been developed to measure price changes in the goods and services typically purchased by colleges through current fund educational and general expenditures. This Higher Education Price Index or HEPI is preferable to general consumer price indices for analyzing college costs, since it reflects price changes most pertinent to higher education. Total costs per FTE student, expressed in 1971 dollars, for fiscal years 1980 through 1987 are displayed in the following table:

Constant Dollar Cost per FTE, Fiscal Years 1980-87

| Fiscal Year | Total Expenditures | HEPI (1971=100) | Constant Dollars | FTEs | Constant $ per FTE |
|---|---|---|---|---|---|
| 1987 | $28,598,742 | 294 | $9,727,463 | 9,172 | $1,061 |
| 1986 | 25,975,507 | 282 | 9,211,173 | 8,960 | 1,028 |
| 1985 | 25,143,727 | 270 | 9,312,491 | 9,252 | 1,007 |
| 1984 | 24,447,040 | 253 | 9,662,862 | 9,423 | 1,025 |
| 1983 | 23,276,218 | 240 | 9,698,424 | 9,630 | 1,007 |
| 1982 | 19,926,005 | 226 | 8,816,816 | 9,273 | 951 |
| 1981 | 18,348,552 | 205 | 8,950,513 | 8,792 | 1,018 |
| 1980 | 17,047,392 | 185 | 9,214,806 | 8,638 | 1,067 |

Deflating FY87 expenditures to constant 1971 dollars revealed a real increase in expenditures per student. However, the real or inflation-adjusted cost per student in FY87 remained less than that of FY80. Components of the HEPI that had relatively large price increases over the decade included utilities, books and periodicals, and employee fringe benefits.

## Summary

The overall cost per full-time equivalent student in fiscal year 1988 was $3,096, down 0.7 percent from FY87. For credit courses, the average cost was $3,302; for noncredit, $2,603. PGCC's costs per student in credit classes continued to be less than both statewide averages and averages for the six largest Maryland community colleges. Adjusting for inflation revealed that PGCC's cost per student in 1987 was less than that of 1980. Thus, comparisons with other institutions and over time reinforced the conclusion that Prince George's continues to be relatively cost efficient.

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Total Cost per FTE, Occupational Disciplines, Fiscal Year 1988

| | Total Discipline Cost | Total FTEs | Total Cost Per FTE |
|---|---|---|---|
| Medical Isotope Technology | $62,490 | 6.8 | 9,190 |
| Respiratory Care | $101,528 | 12.5 | 8,103 |
| Health Services | $91,805 | 13.4 | 6,851 |
| Radiography | $89,724 | 15.7 | 5,715 |
| Nursing | $639,017 | 112.7 | 5,669 |
| Medical Records Technician | $74,063 | 13.9 | 5,328 |
| **Total Health Technology** | $1,058,627 | 175.1 | 6,047 |
| Mechanical Eng. Technology | $75,411 | 13.3 | 5,657 |
| Electronics Eng. Technology | $171,166 | 35.2 | 4,863 |
| Drafting Technology | $123,892 | 29.7 | 4,171 |
| Computer Service Technology | $61,210 | 15.5 | 3,941 |
| **Total Engineering Technology** | $431,679 | 93.7 | 4,607 |
| **Computer Technology** | $1,308,454 | 439.8 | 2,975 |
| Office Administration | $416,292 | 94.2 | 4,419 |
| Early Childhood Education | $92,112 | 25.4 | 3,631 |
| Hospitality Services | $116,324 | 35.9 | 3,240 |
| Criminal Justice | $319,448 | 116.5 | 2,743 |
| Management | $1,307,377 | 489.2 | 2,672 |
| Accounting | $1,176,815 | 444.0 | 2,650 |
| Para-Legal/Legal Assistant | $234,711 | 91.3 | 2,570 |
| Marketing | $206,824 | 81.4 | 2,541 |
| Real Estate | $158,312 | 64.8 | 2,443 |
| **Total Business/Management** | $4,028,215 | 1,442.7 | 2,792 |
| **Horticulture** | $18,459 | 7.4 | 2,505 |
| **TOTAL OCCUPATIONAL DISCIPLINES** | $6,845,434 | 2,158.6 | $3,171 |

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Total Cost per FTE. General Education Disciplines. Fiscal Year 1988

| | Total Discipline Cost | Total FTEs | Total Cost per FTE |
|---|---|---|---|
| Physical Education | $854,482 | 153.6 | $5,562 |
| Health Education | $214,900 | 50.5 | 4,255 |
| **Total Physical/Health Educ.** | $1,069,381 | 204.1 | 5,239 |
| Career Planning | $227,068 | 62.1 | 3,658 |
| Honors | $62,841 | 4.2 | 14,962 |
| Literature | $437,341 | 89.1 | 4,908 |
| Composition/Writing | $2,185,538 | 631.7 | 3,460 |
| **Total English Studies** | $2,622,878 | 720.8 | 3,639 |
| Education | $84,327 | 18.0 | 4,685 |
| Physics | $188,814 | 46.2 | 4,084 |
| Chemistry | $418,503 | 108.4 | 3,861 |
| Biology | $1,000,781 | 272.3 | 3,675 |
| Physical Science | $331,848 | 103.2 | 3,216 |
| **Total Natural Sciences** | $1,939,945 | 530.1 | 3,659 |
| Foreign Languages | $279,005 | 72.1 | 3,870 |
| Art | $505,534 | 145.4 | 3,477 |
| Music | $248,801 | 71.8 | 3,467 |
| Theatre | $119,983 | 34.8 | 3,451 |
| Philosophy | $290,444 | 85.5 | 3,397 |
| Speech Communication | $965,705 | 292.6 | 3,300 |
| English as a Foreign Language | $234,677 | 78.6 | 2,986 |
| **Total Humanities** | $2,644,149 | 780.7 | 3,387 |

PRINCE GEORGE'S COMMUNITY COLLEGE

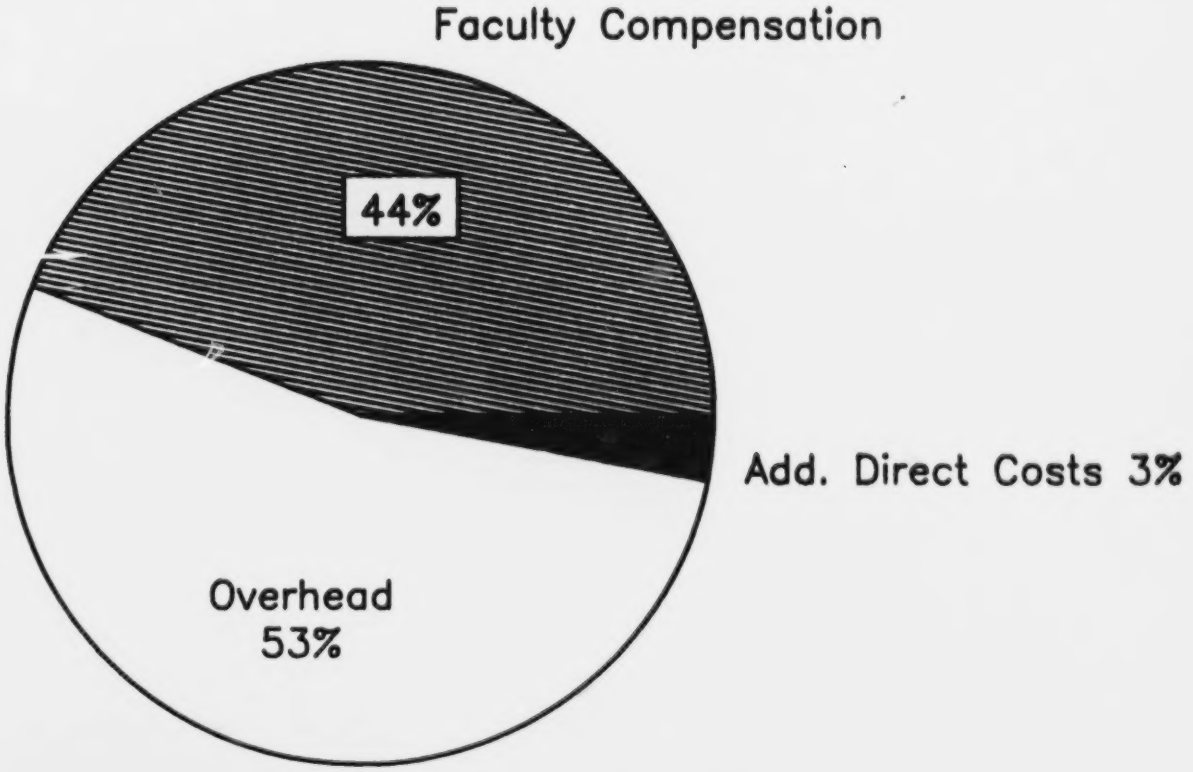
Total Cost per FTE, General Education Disciplines, Fiscal Year 1988

| | Total Discipline Cost | Total FTEs | Total Cost per FTE |
|---|---|---|---|
| Geography | $78,512 | 19.5 | 4,026 |
| Anthropology | $29,334 | 7.3 | 4,018 |
| Social Sciences, General | $6,215 | 1.6 | 3,884 |
| Sociology | $473,260 | 147.6 | 3,206 |
| History | $839,900 | 263.2 | 3,191 |
| Political Science | $243,100 | 76.7 | 3,169 |
| Psychology | $939,768 | 309.5 | 3,036 |
| Economics | $527,056 | 191.9 | 2,747 |
| Total Social Sciences | $3,137,146 | 1,017.4 | 3,084 |
| Engineering | $107,045 | 31.1 | 3,442 |
| Mathematics | $1,808,501 | 601.4 | 3,007 |
| Total Math/Engineering | $1,915,546 | 632.5 | 3,029 |
| College Learning Skills | $11,194 | 3.7 | 3,050 |
| Developmental English/Reading | $729,707 | 259.7 | 2,809 |
| Developmental Mathematics | $748,377 | 282.7 | 2,648 |
| Total Developmental Studies | $1,478,084 | 542.4 | 2,725 |
| TOTAL GENERAL EDUCATION | $15,192,557 | 4,516.0 | $3,364 |

SOURCE: SBCC Discipline Cost Analysis.

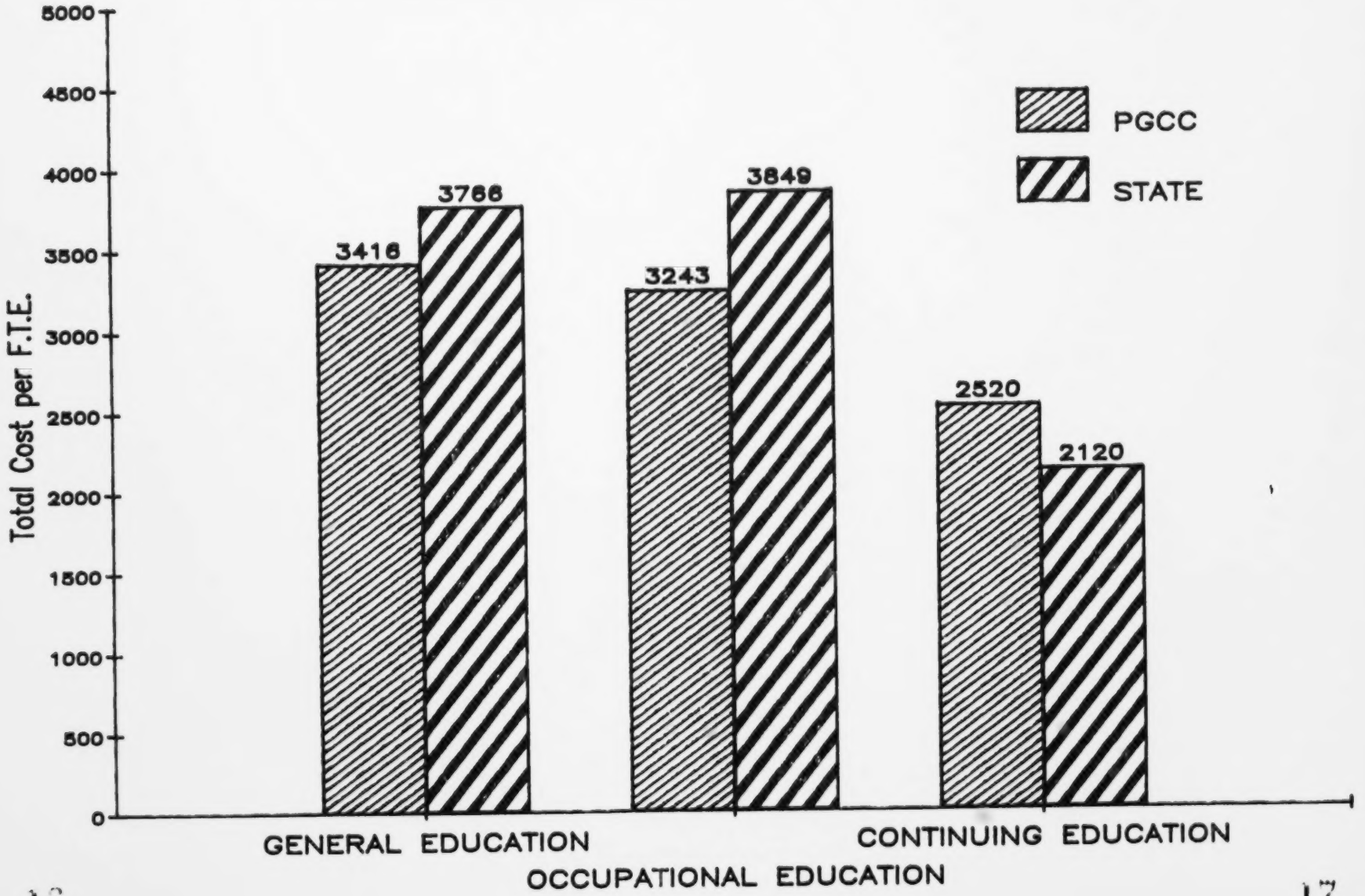
# COMPONENTS OF TOTAL COST

Credit Courses, FY88



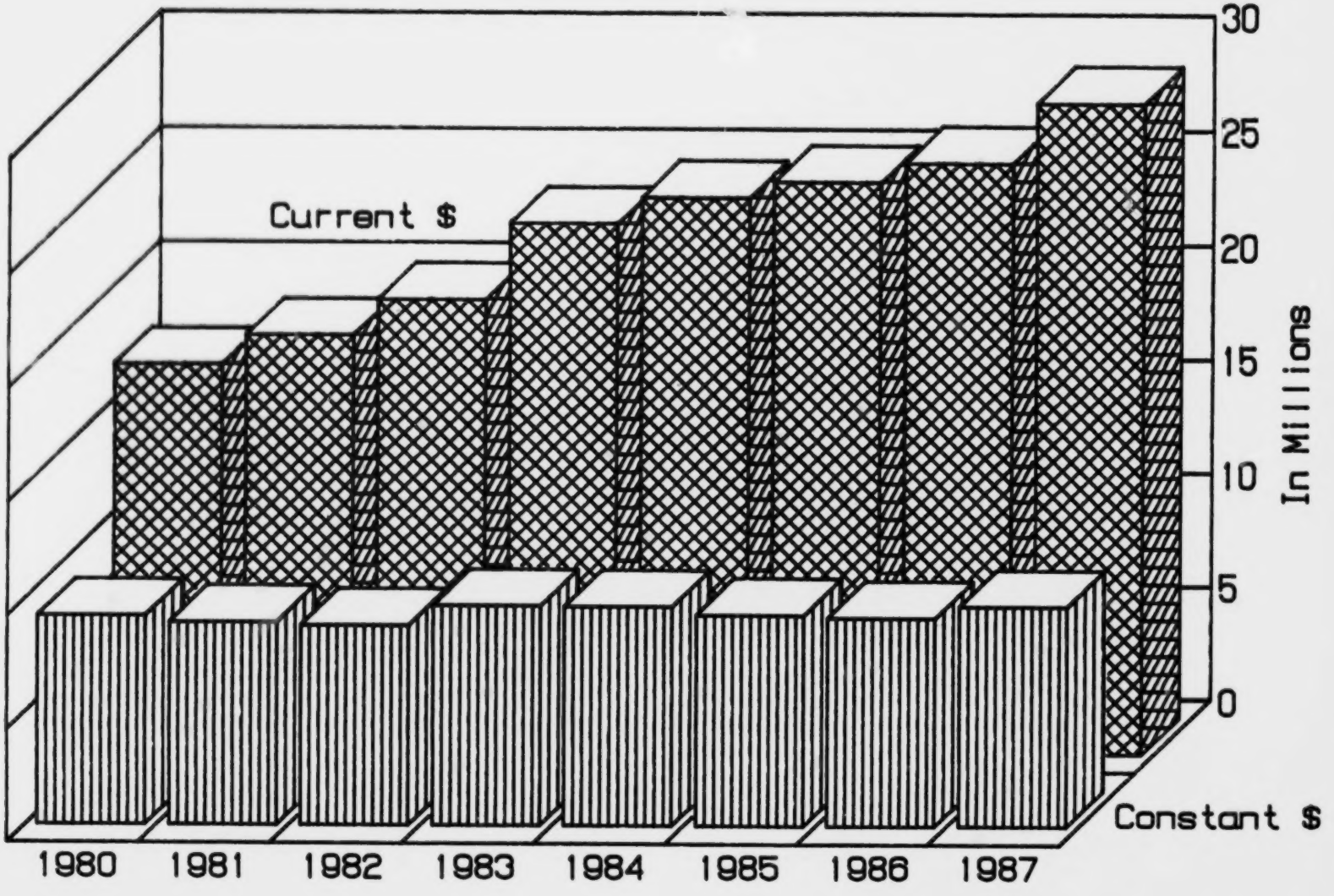

Total Per-Student Cost = $3,302

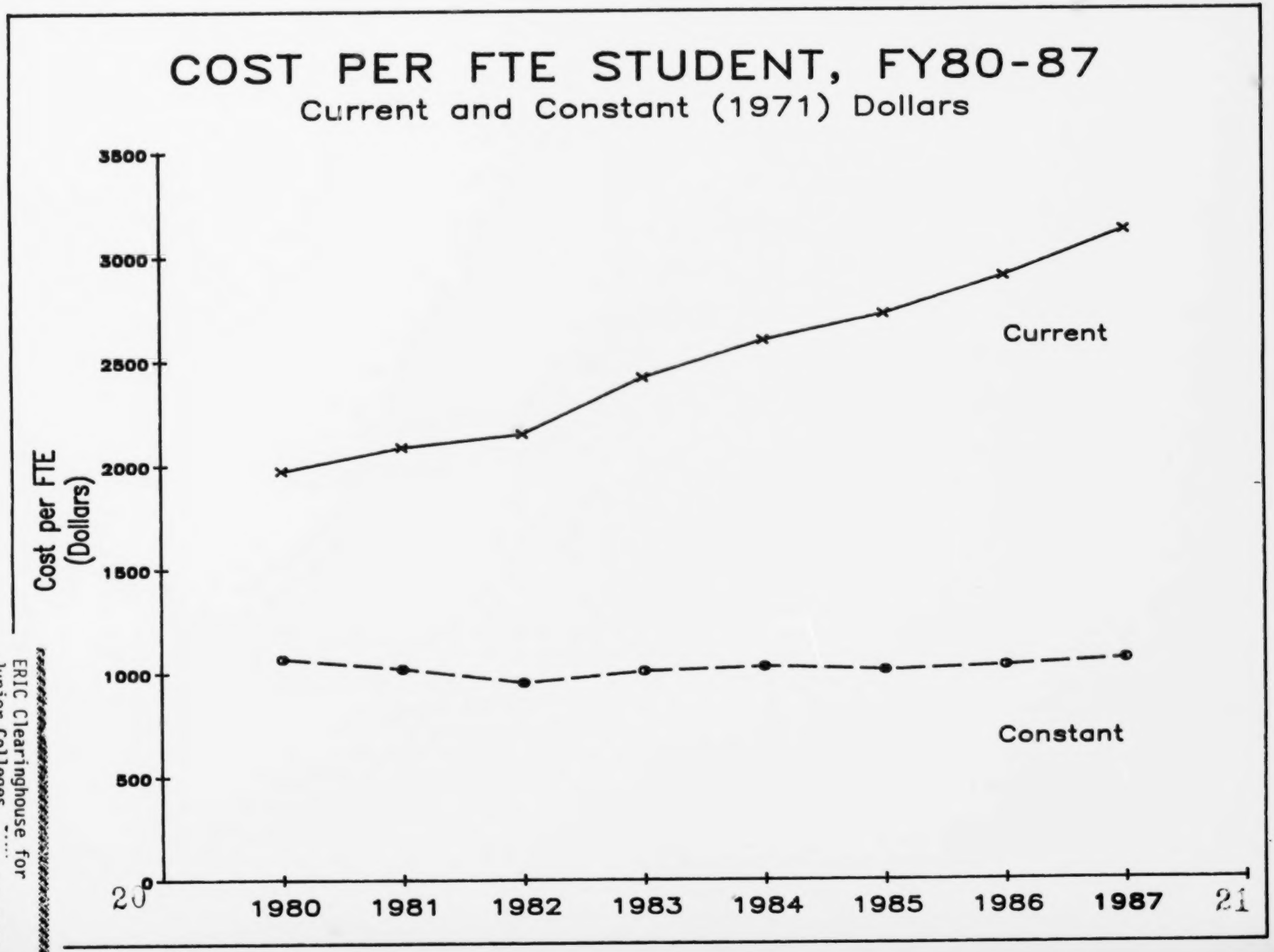
# TOTAL COST PER F.T.E. IN FY87



# CURRENT AND CONSTANT DOLLAR EXPENDITURES

Fiscal Years 1980 - 1987





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